

CORROSION

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NATIONAL ASSOCIATION
OF
CORROSION ENGINEERS



VOLUME 8

JANUARY THROUGH DECEMBER

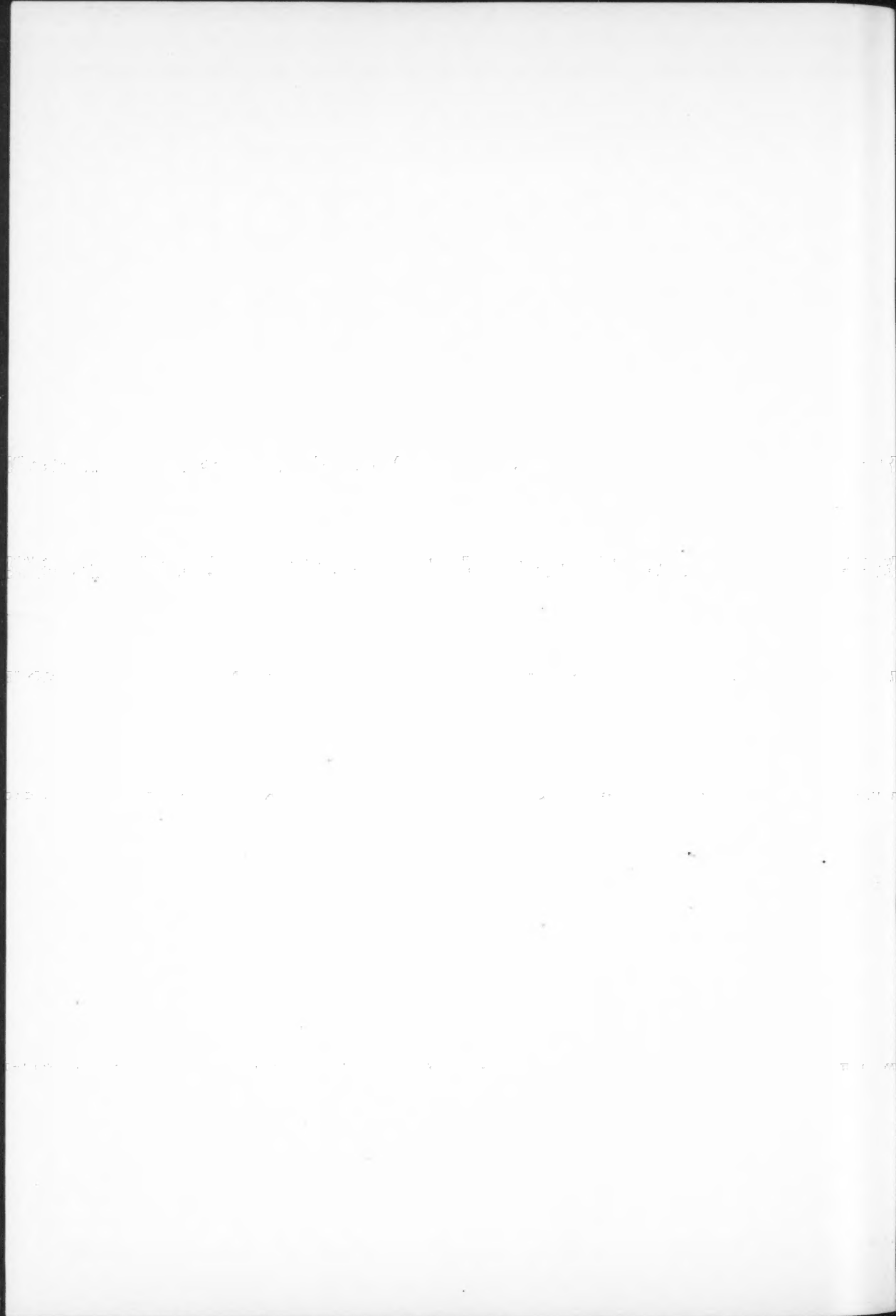
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INDEX TO TECHNICAL MATERIAL

CORROSION

VOLUME 8

JANUARY 1—DECEMBER 31

1952

C O N T E N T S

Tabular Cross Index to Subject Matter
Which Includes:

1. Contents chronologically
2. Contents in page sequence

Authors, Alphabetically
Topical Index to Corrosion Abstracts

PAGE NUMBERS BY MONTHS

Pages		Pages	
1- 48	January	225-256	July
49- 88	February	257-294	August
89-112d	March	293-324	September
113-152	April	325-364	October
153-192	May	365-400	November
193-224	June	401-434	December

TOPICAL INDEX HEADINGS

From the Abstract Filing Index Compiled by the Abstract Committee, National Association of Corrosion Engineers

(Revision as of August 19, 1952)

History of Index—The project of originating a topical index under which abstracts dealing with corrosion can be classified was begun by the NACE Abstract Committee in January, 1947, under the chairmanship of Mrs. Lorraine Voigt Peloubet. This index, in the revision dated August, 1952, is the one used herein for the purpose of cross-indexing technical articles published in CORROSION in the year 1951.

Description of Index—First column of the tabular index contains the titles and authors of technical articles published in CORROSION arranged chronologically by year and month (Volume and Issue) and the number of the page on which the listed article begins. Discussions are entered only when separated from the article to which they refer. Each of the eight major columns to the right is numbered to correspond to the primary subject in the Abstract Filing Index. Within each of the major columns are numbered columns cor-

responding to the sub-topic or secondary subject of the topical index. When the subject matter of an article falls into the topic indicated by any of the first two index numbers, the column number is placed in the column. Under the alphabetical index of authors, each author's contributions are indexed by year and page number.

How to Use Index—To discover the subject matter of a known article, first find the article in the left hand column, search horizontally to the correct numbered columns, then to column headings to learn the secondary and primary topical classification numbers; then refer to the index to learn the topic corresponding to the numbers. To search for a topic in an unknown article, first refer to the index and note the two numbers corresponding to the topic. Refer to the column headings of the table, find the major and minor columns corresponding to the number, and trace down vertically until the column number is reached, then search horizontally to the title of the article to which the number refers.

1. GENERAL

1. Miscellaneous
2. Importance
 1. General
 2. Economics
 3. Effect on Specifications
 4. Prevention in National Defense
 5. Safety and Toxicity
 6. Other
3. Reviews
4. Bibliographies
5. Directories of Material
6. Books
7. Organized Studies of Corrosion
 1. Organizations
 - a. General
 - b. Government cooperative activities
 - c. Technical committee activities
 - d. Other
 2. Test Sites
 3. Other
8. Personalities and Directories of Individuals

2. TESTING

1. General
 1. Calculations and Statistics
 2. Criteria for Evaluation
3. Other
2. On Location Tests
 1. General
 2. Atmospheric Exposure
 3. Service, Evaluation of Materials
 4. Service, Testing of Equipment
 5. Service, Testing of Coatings
 6. Soil Exposure (including surveys)
 7. Waters
 8. Other
3. Laboratory Methods and Tests
 1. General
 2. Accelerated Tests
 - a. General
 - b. Cu strip
 - c. Drop test
 - d. Intergranular test
 - e. Weathering
 - (1) General
 - (2) Spray
 - (3) Exposure to light
 - (4) Other
 - f. Other
 3. Biological Control
 4. Chemical Methods
 - a. General
 - b. Immersion
 - (1) General
 - (2) Alternate
 - (3) Partial
 - (4) Total
 - c. Method of analyses
 - d. Other
 5. Electrochemical and Electrical Methods
 - a. General
 - b. Galvanic couples
 - c. Potential measurements
 - d. Other
 6. Surface Examination
 - a. General
 - b. Electron microscope
 - c. Etching techniques
 - d. Optical methods
 - e. Other

2. TESTING—Continued

7. Physical Methods
 - a. General
 - b. Adhesion, permeability, thickness and hardness tests for coating
 - c. Erosion testing
 - (1) General
 - (2) Abrasion
 - (3) Cavitation-Erosion
 - (4) Erosion-Corrosion
 - (5) Impingement
 - (6) Velocity
 - (7) Other
 - d. Stress corrosion testing
 - (1) General
 - (2) Caustic embrittlement
 - (3) Fatigue
 - (4) Fretting
 - (5) Season cracking
 - (6) Other
 - e. Temperature
 - (1) General
 - (2) Differential (thermogalvanic)
 - (3) High
 - (4) Low
 - (5) Thermal shock
 - (6) Other
8. Pilot Plant
9. Special Techniques
 - a. General
 - b. Electrographic
 - c. Magnetic methods
 - d. Microbalance
 - e. Micrographic
 - f. Polarographic
 - g. Radioactive tracers
 - h. Radiation methods
 - (1) Gamma ray
 - (2) Electron diffraction
 - (3) X-ray technique
 - i. Other
 10. Other
4. Instrumentation
 1. General
 2. Corrosion Test Instruments or Equipment
 3. Non-destructive Inspection Methods
 4. Other
5. Specifications and Standardization
6. Preparation and Cleaning of Specimens
7. Other

3. CHARACTERISTIC CORROSION PHENOMENA

1. General
2. Forms
 1. General
 2. Localized Attack
 - a. General
 - (1) Local elements
 - (2) Theory and mechanism
 - (3) Other
 - b. Compositional changes
 - (1) General
 - (2) Carburlizing
 - (3) Dezincification
 - (4) Embrittlement
 - (a) Hydrogen
 - (b) Other (not caustic)
 - (5) Graphitic corrosion
 - (6) Nitriding
 - (7) Other

3. CHARACTERISTIC CORROSION PHENOMENA (Continued)

- c. Cracking
 - (1) General
 - (2) Intergranular
 - (3) Transgranular
- d. Pitting
- e. Other
3. Uniform Attack
 - a. General
 - b. Films
 - (1) General
 - (2) Theory and mechanism
 - (3) Other
 - c. Other
4. Other
3. Biological Effects
 1. General
 2. Fouling
 3. Macro-organisms
 4. Micro-organisms
 - a. General
 - b. Aqueous environment
 - c. Soil environment
 - d. Other
 5. Other
4. Chemical Effects
 1. General
 2. Catalytic Effects
 3. Composition of Corrosion Products
 4. Concentration (not conc. cells)
 5. Ionization
 6. Oxygen and Other Gases
 7. pH
 8. Specific Ions
 9. Water and Water Vapor
 10. Other
5. Physical and Mechanical Effects
 1. General
 2. Deposits
 3. Erosion
 - a. General
 - b. Abrasion
 - c. Cavitation
 - d. Erosion-Corrosion
 - e. Impingement
 - f. Other
 4. Light
 5. Permeability of Films and Coatings
 6. Porosity of Metals
 7. Pressure
 8. Stress
 - a. General
 - b. Cyclic
 - (1) General
 - (2) Fatigue
 - (3) Fretting
 - (4) Other
 - c. Internal stress
 - d. Static
 - (1) General
 - (2) Caustic embrittlement
 - (3) Season cracking
 - (4) Other
 - e. Other
 9. Temperature
 - a. General
 - b. Differential (thermogalvanic)
 - c. High
 - d. Low
 - e. Thermal shock
 - f. Other
 10. Time
 11. Velocity
 12. Other

3. CHARACTERISTIC CORROSION PHENOMENA (Continued)

6. Electrochemical Effects
 1. General
 2. Concentration Cells
 - a. General
 - b. Crevice corrosion
 - c. Differential aeration
 - d. Other
 3. Conductivity & Resistivity
 4. Contact Potentials
 5. Electro-motive Force
 - a. General
 - b. EMF series
 - c. Redox potential
 - d. Solution potential
 - e. Other
 6. Galvanic Effects—Bimetallic Contact
 7. Long-line Currents
 8. Polarization and Overvoltage
 - a. General
 - b. Depolarizers
 - c. Hydrogen overvoltage
 - d. Oxygen overvoltage
 - e. Other
 9. Stray Currents
 10. Other
7. Metallurgical Effects
 1. General
 2. Alloying Elements
 3. Fabrication and Heat Treatment
 - a. General
 - b. Heat treatment
 - c. Joints
 - (1) General
 - (2) Brazed
 - (3) Riveted
 - (4) Soldered
 - (5) Welded
 - (6) Other
 - d. Shaping and fabrication
 - e. Other
 4. Metallic Structure
 - a. General
 - b. Grain boundaries and size
 - c. Orientation
 - d. Other
 5. Other
8. Miscellaneous Principles
 1. General
 2. Electrochemical Theory
 3. Passivity
 - a. General
 - b. Experimental evidence
 - c. Theories
 - d. Other
 4. Other
9. Other
4. CORROSIVE ENVIRONMENTS
 1. General
 2. Atmospheric
 1. General
 2. Arctic
 3. Flue and Stack Gases
 4. Industrial
 5. Marine
 6. Rural
 7. Tropical
 8. Urban

4. CORROSIVE ENVIRONMENTS (Continued)**3. Chemicals, Inorganic**

1. General
2. Acids, Acid Anhydrides, Acid Salts
3. Bases, Basic Anhydrides, Basic Salts
4. Mixtures
5. Non-metallic Elements
6. Salts
7. Other

4. Chemicals, Organic

1. General
2. Acids
3. Alcohols
4. Carbohydrates
5. Halide Compounds
6. Hydrocarbons
7. Mixtures
8. Nitrogen Compounds
9. Sulfur Compounds
10. Other

5. Soil

1. General
2. Types
 - a. General
 - b. Clay
 - c. Salt mud
 - d. Sandy
 - e. Other
3. Surveys (See 2.2.6)
4. Other

6. Water and Steam

1. General
2. Boiler and boiler feed water, and steam condensate
3. Brackish waters
4. Cooling waters
5. Distilled and demineralized waters
6. Domestic waters
7. Fresh water
8. Mine waters
9. Oil well brines
10. Refrigeration brines
11. Sea water
12. Sub-surface injection water (oil fields)
13. Waste waters and sewage
14. Other

7. Molten Metals**8. Other****5. PREVENTIVE MEASURES****1. General****2. Cathodic Protection****1. General****E. Anodes—Sacrificial (galvanic)**

- a. General
- b. Magnesium
- c. Zinc
- d. Other
- B. External Current Source
 - a. General
 - b. Anodes
 - c. Engine and Other Generators
 - d. Rectifiers
 - e. Other
4. Criteria of Protection
5. Other

3. Metallic Coatings

1. General
2. Specific Coating
 - a. General
 - b. Aluminum
 - c. Cadmium
 - d. Chromium
 - e. Copper
 - f. Gold
 - g. Indium
 - h. Lead
 - i. Magnesium
 - j. Manganese
 - k. Molybdenum
 - l. Nickel
 - m. Silver
 - n. Tin
 - o. Tungsten
 - p. Zinc
 - q. Other
3. Specifications
4. Techniques
 - a. General
 - b. Cladding
 - c. Chemical Reduction
 - d. Diffusion Alloying
 - (1) General
 - (2) Calorizing
 - (3) Corroding
 - (4) Sheradizing
 - (5) Other
 - e. Electrodeposition
 - f. Hot Dip
 - (1) General
 - (2) Lead
 - (3) Tin
 - (4) Zinc (galvanizing)
 - (5) Other
 - g. Tinning

5. PREVENTIVE MEASURES (Continued)

- h. Vaporizing—Metalizing
- i. Other
5. Other

4. Non-metallic Coatings and Paints

1. General
2. Inorganic Coatings
 - a. General
 - b. Cementiferous
 - c. Natural oxide
 - d. Porcelain
 - e. Silicate base
 - f. Other
3. Linings
4. Removers (See 5.9.2)
5. Solid Organic Coatings
 - a. General
 - b. Asphalt
 - c. Bituminous
 - d. Lacquers
 - e. Primers
 - f. Plastics
 - (1) Thermoplastic
 - (2) Thermosetting
 - g. Strip-off materials
 - h. Other
6. Specifications
7. Techniques of Application
 - a. General
 - b. Baking
 - c. Brush
 - d. Flame spray
 - e. Mechanical Spray
 - f. Steam spray
 - g. Other
8. Uses
 - a. General
 - b. Acid-resistant
 - c. Alkali-resistant
 - d. Anti-fouling
 - e. Decorative
 - f. Fire retardant and heat resistant
 - g. Weather resistant
 - h. Other
9. Other

5. Oil and Grease Coatings

1. General
2. Heavy greases
3. Preservative oils
4. Other

6. Packaging

1. General
2. "Cocoon" Method
3. Other

7. Treatment of Medium

1. General
2. Aeration
3. Deaeration
4. Dehumidification
5. Desalting
6. Ion Exchange
7. pH Control
 - a. General
 - b. Neutralization
 - c. Other
8. Sequestering Agents Addition
9. Other

8. Inhibitors and Passivators

1. General
2. Application
3. Mechanism
4. Types
 - a. General
 - b. Inorganic
 - c. Organic
5. Other

9. Surface Treatment

1. General
2. Chemical and electrochemical cleaning
 - a. General
 - b. Caustic cleaning
 - c. Electrolytic cleaning
 - d. Hydride descaling
 - e. Pickling (acid cleaning)
 - f. Vapor-phase and solvent cleaning
 - g. Other
3. Mechanical Cleaning
 - a. General
 - b. Barrel finishing
 - c. Flame cleaning
 - d. Sand and shot blasting
 - e. Shot peening
 - f. Vapor blasting
 - g. Other
4. Surface Conversion
 - a. General
 - b. Anodizing
 - c. Chromatizing
 - d. Electropolishing
 - e. Phosphatizing
 - f. Other
5. Other

10. Other**11. Design—Influence on Corrosion****6. MATERIALS OF CONSTRUCTION****1. General****2. Ferrous Metals and Alloys**

1. General
2. Iron
 - a. General
 - b. Cast
 - c. Electrolytic
 - d. Wrought
 - e. Other
3. Steel, Plain Carbon
4. Low Alloys
5. High Alloys
6. Other

3. Non-ferrous Metals and Alloys—Heavy

1. General
2. Cadmium
3. Chromium
4. Cobalt and cobalt alloys
5. Columbium (Niobium)
6. Copper and copper alloys
 - a. General
 - b. Copper
 - c. Cu-Zn alloys
 - d. Cu-Ni alloys
 - e. Cu-Sn alloys
 - f. Cu-Si alloys
 - g. Cu-Be alloys
 - h. Other
7. Indium and indium alloys
8. Lead and lead alloys
9. Molybdenum
10. Nickel and nickel alloys
 - a. General
 - b. Nickel
 - c. Ni-Cu alloys
 - d. Ni-Cr alloys
 - e. Ni-Mn alloys
 - f. Ni-Mo and Ni-Mo-Fe (Cr) alloys
 - g. Other
11. Noble metals and alloys
 - a. General
 - b. Gold
 - c. Palladium
 - d. Platinum
 - e. Rhodium
 - f. Silver
 - g. Other
12. Rhenium
13. Tantalum
14. Tin
15. Titanium
16. Tungsten (Wolfram)
17. Uranium
18. Vanadium
19. Zinc
20. Zirconium
21. Other

4. Non-ferrous Metals and Alloys—Light

1. General
2. Aluminum and Aluminum Alloys
3. Beryllium
4. Magnesium and Magnesium Alloys
5. Other

5. Metals—Multiple or Combined**6. Non-Metallic Materials**

1. General
2. Asbestos
3. Boron
4. Carbon, Graphite, and Impregnated Materials
5. Cement and Concrete
6. Ceramics
 - a. General
 - b. Brick
 - c. Glass and vitreous silica
 - d. Stone and stoneware
 - e. Other
7. Natural and Synthetic Rubber
 - a. General
 - b. Natural
 - c. Synthetic
 - d. Mixtures
 - e. Other
8. Plastic (other than rubber)
 - a. General
 - b. Thermosets
 - (1) Phenolics
 - (2) Ureas
 - (3) Melamines
 - c. Polyesters
 - d. Thermoplastics
 - (1) Celluloses
 - (a) Nitrates
 - (b) Acetates
 - (c) Butyrates
 - (d) Ethyls
 - (2) Synthetics
 - (a) Vinyls
 - (b) Acrylics
 - (c) Polystyrenes

6. MATERIALS OF CONSTRUCTION (Continued)

- (d) Nylons
- (e) Polyethylenes
- d. Specialties
 - (1) Silicones
 - (2) Fluorocarbons
 - (3) Electropastics
9. Silicon
10. Textile
11. Wood
12. Other

7. Duplex Materials

1. General
2. Ceramics-Metals
3. Duplex Metallic Materials
4. Other

8. Other**7. EQUIPMENT**

1. Engines, Bearings, and Turbines
2. Valves, Pipes, and Meters
3. Pumps, Compressors, Propellers, and Impellers
4. Heat Exchangers
 1. General
 2. Coils and Condensers
 3. Sprays
 4. Other
5. Containers
 1. General
 2. Cans
 3. Caskets
 4. Gas Holders
 5. Tanks
 6. Other
6. Unit Process Equipment
 1. General
 2. Agitators
 3. Autoclaves
 4. Boilers
 5. Concentrators
 6. Digestors
 7. Filters
 8. Fractionating Towers
 9. Other
7. Electrical Telephone and Radio
8. Wires and Cables (non-electrical)
9. Specifications
10. Other

8. INDUSTRIES**1. Group 1**

1. Air Conditioning
2. Architecture and Building
3. Refrigeration
4. Sewage and Water

2. Group 2

1. Communications

3. Group 3

1. Agriculture
2. Beverage
3. Dairy
4. Fermentation
5. Food
6. Sugar
7. Starch

4. Group 4

1. Fuel, Solid
2. Guel, Gas
3. Petroleum Refining and Production
4. Rubber
5. Atomic Energy

5. Group 5

1. Ceramics
2. Glass
3. Pulp and Paper
4. Wood Products

6. Group 6

1. Laundry
2. Soap and Synthetic Detergents
3. Textiles

7. Group 7

1. Graphic Arts
2. Instruments
3. Jewelry
4. Photography

8. Group 8

1. Chemical Manufacturing
2. Distilled Liquor
3. Electroplating
4. Leather and Tanning
5. Metal Fabrication and Finishing
6. Pharmaceuticals

9. Group 9

1. Aircraft
2. Automotive
3. Pipe Line
4. Railroad
5. Shipping

10. Group 10

1. Explosives
2. Metallurgy
3. Mining
4. Ordnance and War Materials
5. Other

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January—Vol. 8—No. 1

Extraneous Currents Noted on Large Transmission Pipe Line System—By Norman P. Allison and Wm. E. Huddleston.	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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February—Vol. 8—No. 2

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March—Vol. 8—No. 3

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- Air conditioning, architecture and building, refrigeration, sewage and water.
- Communications, power.
- Agriculture, beverage, dairy, fermentation, food, sugar, starch.

- Fuel, solids: fuel, gases: petroleum refining and production, rubber, atomic energy.
- Ceramics, glass, pulp and paper, wood products.
- Laundry, soap and detergents, textiles.
- Graphic arts, instruments, jewelry, photography.

- Chemical manufacturing, distilled liquor, electronics, leather and tanning, metal fabrication and finishing, pharmaceuticals.
- Aircraft, automotive, pipe line, railroad, shipping.
- Explosives, metallurgy, mining ordnance and war materials, other.